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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

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In re Application of
Keiji OKADA, et al.
Serial No. 10/030,382
Filed: January 10, 2002

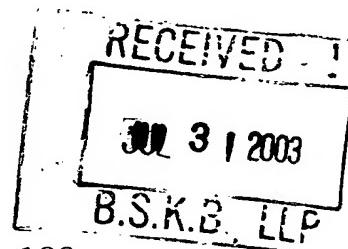
Group Art Unit: 1713

Examiner: Mcavoy, Ellen M

For: VISCOSITY MODIFIER FOR LUBRICATING OIL AND LUBRICATING OIL

The Honorable Commissioner of Patents and Trademarks
United States Patent and Trademark Office
Washington, D. C. 20231

Sir:



DECLARATION UNDER 37 CFR 1.132

I, Keiji Okada, declare and state that:

1. In March 1984, I was graduated from Hiroshima University, Faculty of Science, Department of Chemistry and received a degree of Bachelor of Science from the same University. In March 1986, I was graduated from the master course of the same University, Institute of Science, majoring in chemistry, and received a degree of Master of Science from the same University.

Since May 1996, I have been an employee of Mitsui Petrochemical Industries, Ltd. (Mitsui Chemicals, Inc.), and till the present time I have been engaged in analysis of polymer properties.

2. I am a co-inventor of the invention described in the specification of the above-identified application.

3. I carried out the following experiment.

Experiment

[Synthesis of an Olefin Copolymer]

Ethylene-propylene-octene-ENB copolymer was polymerized in accordance with Example 30 of WO97/38019.

The obtained copolymer was analyzed by the same manner as WO/38019. The obtained copolymer had the ethylene content of 56 % by weight, the propylene content of 30 % by weight, the octane content of 8 % by weight, ENB content of 6 % by weight. Mooney viscosity (ML_{1+4}) of the copolymer was 39. A weight-average molecular weight (M_w) in terms of polystyrene is 27.1×10^4 .

[Preparation of the lubricating oil]

The lubricating oil was produced from a mixed oil 88.98 % by weight, which was composed of Mineral Oil 100 Neutral and Mineral Oil 150 Neutral (by ESSO) (Mineral Oil 100 Neutral/Mineral Oil 150 Neutral = 80/20), as a lubricating oil base, the obtainable polymer 0.52 % by weight as a viscosity index improver (viscosity modifier), Aclube 133 (by Sanyo Kasei) 0.5 % by weight as a pour-point depressant, and a cleaning dispersant (by The Lubrizol Corporation) 10 parts by weight. The properties and the flowability at a low temperature of the lubricating oil obtained were evaluated in the same way of Examples of the present invention.

The result is shown in following table together with Example of the present invention.

Composition and Properties of Lubricating Oils

	Ref. Ex.	C-Ex.1	Ex.1	Ex.2	Ex.3	Ex.4
Used Polymer Type	P-Ex.1	P-Ex.2	P-Ex.3	P-Ex.4	P-Ex.5	
Amount (wt%)						
Lubricating oil Base	88.98	89.04	89.04	89.04	89.04	89.04
Detergent-Dispersant	10.0	10.0	10.0	10.0	10.0	10.0
Pour-Point Depressant	0.5	0.5	0.5	0.5	0.5	0.5
Copolymer	0.52	0.46	0.46	0.46	0.46	0.46
Lubricating Oil Properties						
K.V. at 100°C (mm ² /s)	10.08	10.16	10.14	10.13	10.11	10.11
SSI	52	48.0	47.0	47.0	46.0	46.0
CCS	3140	2780	2770	2790	2760	2750
MRV	49800	23200	23100	23200	22900	22800
Low Temperature Flowability	1	2	1	1	1	1

4. From the results of the above experiment, and based on my knowledge and experience on Polymer Chemistry, I conclude that:

the obtained lubricating oil has higher SSI, CCS, MRV than that of Examples of the present invention, in other words,

copolymer outside of the scope of the present invention shows unacceptable low-temperature properties of the lubricating oil.

The undersigned declares further that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine

or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issuing thereon.

Respectfully submitted,

this 14th day of July, 2003

Keiji Okada

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